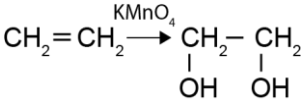
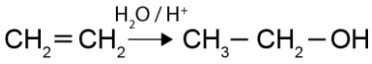
ANSWERS: Mostly one step organic reactions

1. To convert propan-2-ol to propene, add concentrated sulfuric acid (which is a dehydrating agent). It is an elimination reaction because OH and H are removed from adjacent carbon atoms and a double bond is created to form an alkene.
To convert propene to propan-2-ol, add dilute (sulfuric) acid. This is an addition reaction because the double bond is broken forming a C-C (single) bond, allowing H and OH from water to bond to the C atoms that were double bonded together.

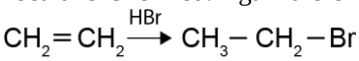
2. Ethene reacts with aqueous $KMnO_4$ to form a diol, ethan-1,2-diol.



This is an oxidation or addition reaction in which the double bond is broken and two –OH groups attach to each C atom of the double bond. The purple $KMnO_4$ turns brown (or colourless)
Ethene reacts with dilute acid, H_2O / H^+, to form ethanol.

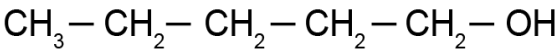


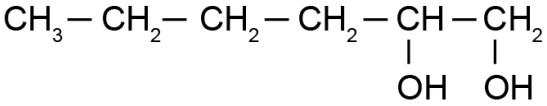
This is an addition reaction as once again the double bond is broken. However, in this reaction one –OH group and one –H atom attach to each C atom of the double bond. No colour changes are observed in this reaction.
When ethene reacts with hydrogen bromide, bromoethane is formed. Again there is no colour change observed.



This reaction is an addition reaction, as the double bond is broken and two atoms are added to each C atom of the double bond. In this reaction one H and one Br atom are added.
All three reactions involve the breaking of the double bond.
All three reactions involve addition.
Two of these reactions are addition reactions and one is an oxidation reaction.
Only one of the reactions gives a colour change that is easily observed.

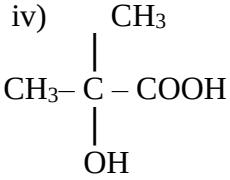
3.

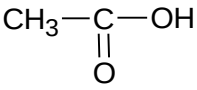




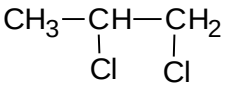
4. MnO_4^- / H^+ or $Cr_2O_7^{2-}$ / H^+
purple → colourless, or orange → green
2-methylpropan-1-ol. Since it is a 1° alcohol it can be oxidised to a carboxylic acid / since the others are secondary or tertiary alcohols and can't be oxidised to a carboxylic acid.

5.

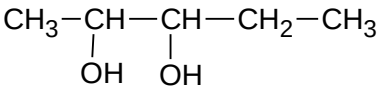
(i) CH_3COOH (accept ethanal, if its full structure is given) (ii) CH_3COONa or CH_3COO^- iii) Structural isomers are: $CH_3 – CH = CH – CH_3$ (but-2-ene) $CH_2 = CH – CH_2 – CH_3$ (but-1-ene) $CH_3 – C(CH_3) = CH_2$ (2-methyl propene) $CH_3 – C(CH_3) = CH_2$	iv)  Alcohol reacts with $Cr_2O_7^{2-}$ / is oxidised : to form carboxylic acid. This must be a (carboxylic) acid because it reacts with sodium carbonate. The tertiary OH group isn't oxidised by acidified dichromate./ only the primary OH / OH on the end carbon is oxidised / reacts

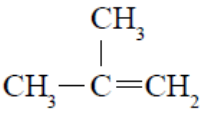
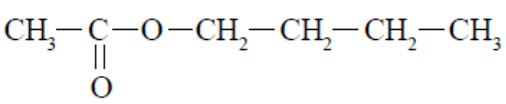
6. a)  **OR** CH_3COOH **OR** CH_3CO_2H

b)



c)



7. Conc. sulfuric acid / conc. H_2SO_4	**8.** (i)  (ii)  (iii)